UNIVAC 1050 SYSTEMS

MAGNETIC TAPE SYSTEM

DESIGN SPECIFICATIONS

C O R D I A L

T A P E S E R V I C E R O U T I N E

UP 3940.9

1.0 C O N T E N T S

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2.0 INTRODUCTION

CORDIAL (CORrecting Data In All Locations) is a service routine system designed to facilitate servicing tapes on the UNIVAC 1050 system. Checking of 1050 convention block numbers on reading and updating block numbers on writing are automatically supplied. When conventions are canceled (a user option), the routine will also handle tapes in non-conventional format. The system will perform specific jobs, called internal functions, at user command. Other larger service needs can be approached as external functions which are accessed as system overlays as part of the overall service system. One external function is currently included, a data tape print routine. A log of the functions performed is available, unless suppressed, as printer output.

The internal functions supplied are

1. advance tape forward on servo 'n',
2. move tape backward on servo 'n',
3. rewind servos (specified servos or all servos moved),
4. copy from one servo to another,
5. copy with corrections,
6. copy with verified corrections,
7. search forward for a specified key block, and
8. compare two tapes.

2.1 INPUT CARDS - GENERAL DISCUSSION

The format of the input control cards is basically that of the PAL Assembly System. Since in some cases the number of parameters needed is quite large, advantage has been taken of other than the operands field as locations for specific parameters. The major control for internal and external functions is in column 1 of each input card. If a certain number of blocks need be referenced, the number must always appear starting in column 7 (label field). When the starting location, within a block, of certain key characters is expressed, it always falls in the Op field starting at column 13. Other parameters appear in the operands field starting at column 19 and are separated by commas. Separate appendices of information necessary to the UNIVAC IIIA or UNIVAC IIIC user follow the main description of the control cards.

The rules for writing the PAL language generally hold for CORDIAL. In quick summary the following are of particular note. Octal numbers are expressed with a leading zero. Decimal numbers are converted to binary by the system. Alphabetic or alphanumeric quantities will be scanned as labels unless enclosed between apostrophes, and therefore should not be used without apostrophes to express key characters. The only alphabetic parameters specified are noted under the "M" and "S" cards. Leading spaces within parameters will be ignored.

2.2 THE LOG

The printed log is a visual interpretation of the commands which appear on the input cards. The headings should be self explanatory when considered with the input cards. Comments relative to the log, peculiar to each command, appear under the description of the specific control cards.

An "E" under ERROR in the log usually represents a missing parameter. It can represent a variance in expected tape data as compared to card data (see verified corrections). When "E" appears, the respective card has been bypassed. When an "F" is the error indication printed, it indicates a format error violating some rule of the PAL Assembler. Appropriate truncation will take place and processing will continue.

2.3 BLOCKSIZE

The data block size allowed is calculated at object time and displayed in octal format in lights on the console. The blocksize for the compare function will be only half that large.

2.4 BLANK CARDS

Blank cards will generally cause no concern and will be bypassed by the system. For an exception see the discussion under the copy with corrections commands.

3.0 INTERNAL FUNCTIONS

3.1 MASTER CONTROL CARD - "M" CARD

The "M" card imposes a condition which will hold true for all commands which follow. It is used to suppress the handling of 1050 data tape conventions and to suppress printing the log. Either option may be specified alone or they may be specified together. The "M" card is not necessarily the first command card in the user's deck. When he wants to update tapes in both 1050 format and other formats, he places the cards which will update the 1050 format tapes first, followed by an appropriate "M" card and the cards necessary to update the other tapes. The format should be chosen from those shown below.

■ Format

Col. 1	7	13	19
M			NOPRINT
M			NOPRINT,NOCONV
M			NOCONV,NOPRINT
M			NOCONV

■ Legend

In the following control cards this legend applies:

1. bbbbb = number of blocks
2. s = servo number
3. dddd = starting character position (N.B. Count from 0)
4. cc = number of characters (must be less than or equal to 16)

3.2 POSITION TAPE FORWARD - "F" CARD

The read or position tape forward command will advance the tape on the chosen servo the specified number of blocks.

■ Format

Col. 1	7	13	19
F	bbbbb		s

3.3 POSITION TAPE BACKWARD - "B" CARD

The position tape backward command will move the tape on the chosen servo in a backward direction the specified number of blocks.

■ Format

Col. 1	7	13	19
B	bbbbb		s

3.4 REWIND - "R" CARD

The rewind control card offers two options. You may specify the servos to be rewound, or you may rewind all the servos that have been advanced by the system past the load point. The rewind is with interlock.

■ Format

Col. 1	7	13	19
R			$s_1, s_2, \ldots, s_n$
R		ALL	

3.5 COPY - "C" CARD

The copy command allows the user to copy a specified number of blocks from one servo to another. The input servo appears as parameter 1, the output servo as parameter 2 in the operands field.

When 1050 conventions are in force, an updated block number is inserted into each output block. For example, when the input tape has, previous to this command, been advanced n blocks, the current block number is n+1. The output tape starting from load point will have inserted block numbers starting with 1 rather than starting with n+1. Or if the output tape has already had x blocks of data written on it the additional block numbers will start with x+1.

The termination of the copy can be specified in one of two ways. The number of blocks to be copied may be shown in the usual way, i.e., starting in column 7.

■ Format 1

Col. 1	7	13	19
C	bbbbb		s_1, s_2

The other termination method is to show, starting in column 13, the starting character position of the n number of characters in a key. (N.B. Character position is determined by counting from character 0.) The actual number of characters in this key must be less than or equal to 16 and appear as parameter 3 in the operands field. The key characters will appear as parameter 4 in the operands field. The block in which the key appears will be the last block copied.

■ Format 2

Col. 1	7	13	19
C		dddd	s_1, s_2,cc,key characters

3.6 COPY WITH UNCHECKED CORRECTIONS - "K" CARD AND COPY WITH VERIFIED CORRECTIONS

The two copies with corrections commands have an identical first card, very similar to the card for a straight copy. The only variance appears in column 1 where a K must be present. The same options, as far as the termination of the K copy, apply as for the straight copy.

■ Format 3

Col. 1	7	13	19
K	bbbbb		s_1, s_2
K		dddd	s_1, s_2,cc,key characters

The cards which follow the "K" card determine whether unchecked or verified corrections will be applied. They may be interspersed. They must be terminated by a card with END appearing in columns 1, 2, and 3. Any card (including a blank) other than one of these expected cards will cause the copy to be prematurely terminated.

3.6.1 Unchecked Corrections - "U" Card

The U card has a U in column 1 and the block number relative to the beginning of the tape in column 7. It shows the starting location of the characters to be replaced, the number of characters, and the new characters themselves in the following format:

■ Format

Col. 1	7	13	19
U	bbbbb	dddd	cc, new characters

3.6.2 Verified Corrections - "V" Card

The V card duplicates the format of the U card except that it adds another parameter which specifies the characters that must be equaled before the new characters will be inserted.

■ Format

Col. 1	7	13	19
V	bbbbb	dddd	cc,new char., char. to be matched

3.6.3 END Corrections - END Card

■ Format

Col. 1	7	13	19
END			

When the log of the commands is printed it will be noted that if equality is not found on a "V" correction, the characters that appear on tape will be printed under the characters to be equaled in the column headed Old Characters. The column headed Key Characters represents the new characters to be substituted. When equality is not reached an "E" will appear under ERROR on the log and no substitution takes place.

3.7 SEARCH - "S" CARD

The search or S command will read forward on the specified servo a certain number of blocks until a specified key is found. The number of the block in which the key is found will be printed and the user has the opportunity of searching further and printing block numbers for all instances of this or of stopping with the tape positioned at this point. The formats of the two options appear below.

■ Format

Col. 1	7	13	19	46
S	bbbbb	dddd	s,cc,key characters	ALL
S	bbbbb	dddd	s,cc,key characters	

N.B. The block number printed represents a count of the number of blocks read on this servo, not the 1050 convention block number which appears in the second, third, and fourth positions of the block. These positions may or may not equal the count of the blocks read. This option can therefore be meaningfully used for tapes in non-standard format.

3.8 COMPARE OR LOOK AT TWO TAPES - "L" CARD

The compare or look at command will test for equality, on a character-by-character basis, every character of synchronous blocks of each of two input tapes. The servos are designated as parameters 1 and 2 in the operands field. The compare can be terminated either by reaching a designated number of blocks or by reaching a key within a block. See discussion under Copy.

■ Format

Col. 1	7	13	19
L	bbbbb		s_1,s_2
L		dddd	s_1,s_2,cc,key characters

When inequalities appear, they are printed on the log with the number of the block and the starting character position of the difference. They are printed in up to 16 character batches. The data from the servo first specified will appear under the heading of Key Characters, while data from the second specified servo will appear Old Characters. When the blocks are of different sizes, printing, if any, for the shorter block will of course terminate at its block end. The characters from the longer block will be listed in 16 character groups under the appropriate header as specified above.

3.9 TERMINATE - "Z" CARD

The final card in a users control deck will be a Z card. A Z must appear in column 1. If the user wishes to locate and load his next program of the day, the four character identification (yyyy) of that program must be included as characters 2 through 5 of the Z card.

■ Format

Col. 1	7	13	19
Z			
Z yyyy			

4.0 EXTERNAL FUNCTIONS - "X" CARD

An external function is called via an X card. The only entries on the X card are an X in column 1 followed by the four character identification (yyyy) of the external function in columns 2 through 5.

- Format

Col. 1	7	13	19
Xyyyy			

One external function is presently supplied, a tape to print routine. It is called in the following way:

Col. 1	7	13	19
XCOR2			

This card is followed by a detail card specifying mode, limit, servo, type of printing, and translation.

The tape to print function requires the user to specify mode of the input tape in the same fashion as for internal functions. See appropriate appendix (for A and C tapes) for particular instructions. This entry appears in column six.

The limit for this printing function, as for the internal functions, is contained in columns 7 to 11. It can be expressed in one of four forms. If the columns contain spaces, printing will continue until the computer is stopped by the operator or until a faulty tape condition appears. If the columns contain the expression SENTS, a test is made for standard 1050 data tape convention sentinels (a 6 or 7 in the first character position of the block). The routine will print the first of these blocks and stop upon finding the second. If the columns contain the expression TMARK printing will terminate when a tape mark is found. The words "tape mark" will be printed after it is sensed. When digits appear in the control columns printing will terminate as that number of blocks is reached.

- Format 1

Col. 1	7	13	19
	SENTS TMARK bbbbb		

Three parameters may appear starting in column 19. The servo number appears as the first parameter to be listed. The user may specify either ALPHA or OCTAL printing as the next parameter if he wishes. If he specifies neither, printing will be in both forms. The third parameter specifies translation. He may call for 'U3A' for translation into UNIVAC III package A print code or 'U3B' for package B code. 'FLDD' will yield translation into 1107 field data code. Any other expression will cause the first 64 columns of the next card read to be used as a translate table.

■ Format 2

Col. 1	7	13	19
			S
			S, ALPHA
			S, OCTAL
			S,,translation identification
			S, ALPHA, translation identification
			S, OCTAL, translation identification

After printing is terminated a card with a "W" in column 1 is expected. To reload the CORDIAL internal function control routine insert a "C" into column 2 of this card, otherwise control will be released to the operating system.

■ Format

Col. 1	7	13	19
W			
WC			

5.0 APPENDIX FOR IIIA TAPES

5.1 MODE

The mode of all input and output tapes is assumed to be four. If the user wants to process tapes in either of the other two modes, he must specify this by inserting a 3 or 5 into column 6 of his input card. Any of the following commands will allow an entry in column 6: F, B, C, K, L, S. Once the mode has been changed via one of the preceding orders, it will remain for all succeeding I/O orders in that changed mode until altered again. The only acceptable entries in a UNIVAC IIIA system, in column 6, are a 3, 4, or 5. Non-standard entries will cause unspecifiable problems and no recovery is guaranteed.

5.2 RESTRICTIONS

No provision is made for contingency write orders. It is therefore improbable that reading forward on a tape followed by writing on the same tape will be successful.

There is no sentinel checking performed in the CORDIAL internal function system. No recognition of the end-of-tape window is made.

6.0 APPENDIX FOR IIIC AND IVC TAPES

6.1 MODE

The mode of all input and output tapes is assumed to be 556 BCD. If the user wants to process tapes in any other mode he must specify this by inserting an appropriate entry from the table below into column 6 of his input card. Any of the following commands will allow an entry in column 6: F, B, C, K, L, S. Once the mode has been changed via one of the preceding orders it will remain for all succeeding I/O orders in that changed mode until altered again. Only those entries that appear in the table below are permissable. Non-standard entries will cause unspecifiable problems and no recovery is guaranteed.

Col. 6		MODE and ppi	
1	=	Binary	200
2	=	Binary	800
3	=	Binary	556
4	=	BCD	556
5	=	BCD	200
6	=	BCD	800

6.2 SPECIAL CASE

The copy instructions will allow the user to specify via an extra parameter, appearing last, if he wishes the mode on the output tape to be another one than the one specified in column 6. Refer to the table above for the form of the parameter.

6.3 RESTRICTION

There is no sentinel checking performed in the CORDIAL internal function system.

7.0 O P E R A T I N G I N S T R U C T I O N S

1. Load CORDIAL via the standard operating system. The call is $CORØ.

2. CORDIAL will stop displaying, in octal, permissable data block size. Hit the PROGRAM START button.

3. CORDIAL will print log of functions on printer as they are performed. Printer should be set as for the assembler, with 4 or 5 holes above the bracket.

4. STOP Display is 077. Hit the PROGRAM START button.

8.0 DISPLAY STOPS IN CORDIAL

All stops are JD stops: 30 memory 60.

The allowable data blocksize will be displayed as the first stop in CORDIAL. Hit the PROGRAM START button to continue.

DISPLAY	ERROR	ACTION
014uu03 uu = unit	Tape block count error	1) Hit the PROGRAM START button twice to loop in Executive Routine. Operator should jettison program. 2) To bypass error, hit the PROGRAM START button and then depress M button on next display.
0110001	Card reader error	Refeed the cards in the error stacker.
0000077	End display	
0000066	Program error	Tape memory dump and send to Systems Programming.
0000011	Too little memory available for minimum blocksize	Rerun when more memory is available.

Standard printer displays also can be expected upon printer error conditions.

9.0 SUMMARY OF AVAILABLE COMMANDS

Col.	1	7	13	19
Master	M			NOPRINT
	M			NOPRINT,NOCONV
	M			NOCONV,NOPRINT
	M			NOCONV
Forward	F	bbbbb		s
Backward	B	bbbbb		s
Rewind	R			$s_1,s_2,\ldots,s_n$
	R		ALL	
Copy	C	bbbbb		s_1,s_2
	C		dddd	s_1,s_2,cc,key characters
Copy with corrections	K	bbbbb		s_1,s_2
	K		dddd	s_1,s_2,cc,key characters
Unchecked	U		dddd	cc,new characters
Verified	V		dddd	cc,new characters, characters to be matched
	END			
Search	S	bbbbb	dddd	s,cc,key characters ALL
	S	bbbbb	dddd	s,cc,key characters
Look at or	L	bbbbb		s_1,s_2
compare	L		dddd	s_1,s_2,cc,key characters
Terminal	Z			
	Zyyyy			
External Function	Xyyyy			
End External function	W			

Legend:

bbbbb = number of blocks
s = servo number
dddd = starting character position (from 0)
cc = number of characters (0<cc<16)
yyyy = program ID